

Improving the Outcome of Denture Relining

Mark E. Knechtel, DDS; Robert W. Loney, DMD, MS

When residual ridge resorption occurs, dentures tend to become loose. For most patients, denture relining is an economical means of improving a denture's stability and retention, the overall occlusal vertical dimension and, in some cases, facial appearance. Although improvements in retention, stability and occlusion do not always improve chewing efficiency,¹ Garret and others² found that "almost all patients perceived improvement in ... chewing comfort, chewing ability, less difficulty eating hard foods, and eating enjoyment. Most patients also reported improvements in speech and security. These results support the beliefs of clinicians and observations of some researchers that patients benefit from properly fitting dentures." This paper outlines several techniques for improving relining procedures.

Indications for Relining

Any denture that is loose because of poor adaptation to the supporting tissues should be relined.³⁻⁵ However, denture looseness can result from problems with denture occlusion, tooth position and denture contours.⁵⁻⁷ If these problems are not correctly diagnosed and corrected, relining will not improve retention and stability of the denture. Use of proper

diagnostic techniques will ensure that the specific problem is correctly identified.⁸

From a practical and financial standpoint, it is also important to ensure that a denture requiring relining is sufficiently acceptable in other respects to justify prolonging its lifespan.^{7,9} Major inadequacies in vertical dimension of occlusion, occlusion contact relationships, patient appearance and tooth wear may make it more cost effective to remake the denture rather than to reline it. Oral tissues should be in a state of optimal health to realize the best results from a relining procedure. When required, a tissue conditioner may be used to improve tissue health.¹⁰

Denture Relining Techniques

There are 2 main methods of relining dentures: the direct (chairside) method and the indirect or processed method (subdivided into the impression and functional impression techniques). In general, the indirect method has been preferred and most frequently taught in dental schools.¹⁰ However, no long-term studies have compared the outcomes of the 2 methods. There are time and cost savings with the chairside method, but the materials used have significant disadvantages (**Box 1**).

There are no long-term studies comparing differences in outcomes between the impression

Box 1 Disadvantages of chairside relining^{5,11-17}

- Heat from polymerization of some materials could burn the oral mucosa
- Porosity of some materials may lead to bad odours
- Material may become distorted if the relined denture is removed from the patient's mouth before complete polymerization
- Some materials exhibit greater dimensional change during polymerization than is the case for processed materials
- Some materials exhibit weaker or variable bond strength
- Patient may experience discomfort and unpleasant taste
- Some materials may exhibit cytotoxicity
- Colour stability may be poor (**Fig. 1**)
- Some materials have a limited lifespan



Figure 1: A discoloured, unserviceable denture one year after initial chairside relining.

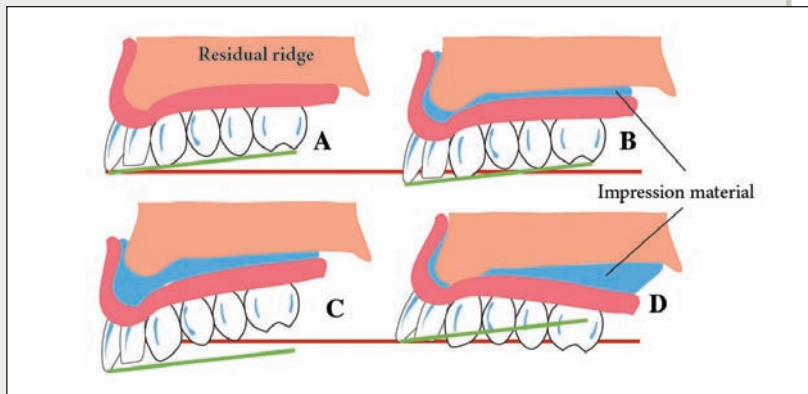


Figure 2: Denture positioning errors. (a) Pre-impresion relationship of teeth, denture base and tissues. The red line indicates the horizontal plane through the original position of the incisal edge, and the green line indicates the angle of the original occlusal plane. (b) Insufficient vertical seating lengthens the incisors and positions them facially. (c) Excess relining material in the anterior region may displace the denture facially and may alter the angle of the occlusal plane. (d) Excess relining material in the posterior region may change the angle of the occlusal plane and the incisal inclination and can cause an anterior open bite.

technique and the functional impression technique. No matter which relining technique is used, it is virtually impossible to place a denture filled with impression material in exactly the correct position.¹⁸ Failure to properly position the denture in 3 dimensions can result in unwanted changes in the amount of incisal display, the degree of lip support and/or the occlusal contact relationships. The most common errors tend to be having the denture seated too far anteriorly or inferiorly when making the impression,¹⁸ which results in an increase in vertical dimension and/or change in denture orientation (Fig. 2). These errors can be minimized by using a low-viscosity elastomeric impression material or tissue conditioner.¹⁸

Relining Tips

The following tips can help to improve the results of relining procedures, regardless of technique (Figs. 3–12).



Figure 3: As the first step in a relining procedure, clean the denture. For maximal bond strength, use an ultrasonic cleaner and/or pumice and tin oxide on a rag wheel or brush to ensure that new acrylic will not be applied over calculus or plaque. A denture that may appear free of calculus when damp (at left) may exhibit residual calculus when thoroughly dried (at right).



Figure 4: Failure to properly orient the denture during the impression stage of the relining procedure may cause lengthening of the incisors, increased display of gingival acrylic and a shift in the midline; see top photo. Therefore, before relining, measure the vertical incisal display at rest and the occlusal vertical dimension. After the relining impression has been taken, confirm that these measurements have not changed significantly, unless a change is desired. These measurements will help to ensure proper orientation of the denture (see bottom photo).



Figure 5: For impression-type relining procedures, mark the centric contacts before and after taking the impression. Use one colour before taking the impression, leave the markings on the denture, and use a different colour after taking the impression. In this photograph, contacts marked before the impression (red) closely coincide or overlap with those marked after the impression (blue).



Figure 6: Relieve any acrylic in the undercut areas of the base and flange so that the master cast will release easily from the denture without damage. A dental assistant in your office or staff in your laboratory can be trained to do this to expedite the relining procedure.



Figure 7: Shorten any denture flanges that are too long. Special burs can be purchased to ensure even reduction of the denture. Provide room for the impression material, so that the impression does not inadvertently increase the occlusal vertical dimension. Train laboratory or auxiliary personnel to reduce the denture base to improve the efficiency of relining procedures.



Figure 8: Place vent holes throughout the maxillary base to aid in seating the denture to the proper position and to prevent separation of the impression from the denture during removal from the mouth. Lower dentures rarely require such relief.



Figure 9: A thin layer of impression material will suffice and will induce less gagging. Use a cement spatula or a #7 wax spatula to tease the material completely over the edge of the flange, to minimize voids in this area. The impression material should not completely fill the denture, but rather should follow the internal contours.



Figure 10: Before the initial set, remove excess material with cotton-tipped applicators, so as to improve the contours of the impression and reduce the need for trimming. Here, a tissue conditioner used in the functional relining technique is shown, but this technique can also be used with impression-type relining.



Figure 11: To facilitate correct positioning of the denture, have an assistant help you to retract the lip so that both the anterior and the posterior vestibules can be seen simultaneously. Seat the denture until the impression material expresses over the denture flange and is visible throughout the vestibule. Have the patient tap the teeth together lightly; if the occlusion does not appear correct, modify the position of the denture. Once the occlusal contacts look acceptable, remove the mouth mirrors and lightly mould the borders of the reline impression.

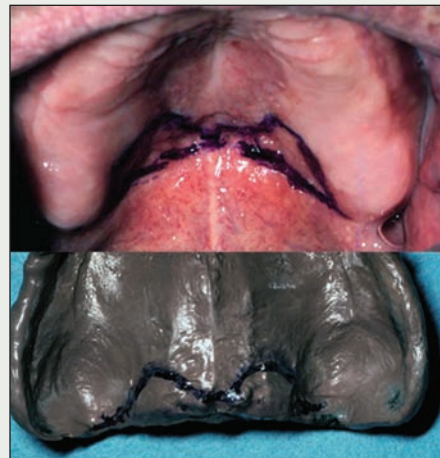


Figure 12: To ensure adequate retention, mark the posterior palatal seal area. If this portion of the denture is not placed properly, the relining procedure may ultimately fail, with the denture being nonretentive.

Conclusion

Once the impression phase of a relining procedure is complete, confirm the results. Trim away excess impression material, replace the denture(s), and check retention, stability and occlusion. When the relined denture is ready for delivery, treat it like a new denture, using pressure-indicating paste, articulating paper and other suitable tools. Finally, take the time to remount the denture. There is good evidence that this procedure will ultimately save time, as it decreases the need for future appointments to eliminate sore spots.¹⁹ ♦

THE AUTHORS



Dr. Knechtel is instructor and head, division of patient and community care, faculty of dentistry, Dalhousie University, Halifax, Nova Scotia.



Dr. Loney is professor and head, division of removable prosthodontics, faculty of dentistry, Dalhousie University, Halifax, Nova Scotia.

Correspondence to: Dr. Mark E. Knechtel, Division of Patient and Community Care, Faculty of Dentistry, Dalhousie University, 5981 University Ave., Halifax, NS B3H 1W2. Email: mr674907@dal.ca.

The authors have no declared financial interests.

References

- Perez P, Kapur KK, Garrett NR. Studies of biologic parameters for denture design. Part III: Effects of occlusal adjustment, base retention, and fit on masseter muscle activity and masticatory performance. *J Prosthet Dent* 1985; 53(1):69–73.
- Garrett NR, Kapur KK, Perez P. Effects of improvements of poorly fitting dentures and new dentures on patient satisfaction. *J Prosthet Dent* 1996; 76(4):403–13.
- Barco MT, Moore BK, Swartz ML, Boone ME, Dykema RW, Phillips RW. The effect of relining on the accuracy and stability of maxillary complete dentures — an in vitro and in vivo study. *J Prosthet Dent* 1979; 42(1):17–22.
- Christensen GJ. Relining, rebasing partial and complete dentures. *J Am Dent Assoc* 1995; 126(4):503–6.
- Zarb GA, Jacob R. Prolonging the useful life of complete dentures: the relining procedure. In: Zarb GA, Bolender CL, editors. *Prosthetic treatment for edentulous patients: complete dentures and implant-supported prostheses*. St. Louis: Mosby; 2003. p. 471–80.
- Grant AA, Heath JR, McCord JF. *Complete prosthodontics: problems, diagnosis and management*. London: Wolfe; 1994. p. 56–67.
- Christensen FT. Relining techniques for complete dentures. *J Prosthet Dent* 1971; 26(4):373–81.
- Loney R. Diagnosing denture pain: principles and practice. *J Can Dent Assoc* 2006; 72(2):137–41.
- Levin B. A reliable relin-rebase technique. *J Prosthet Dent* 1976; 36(2):219–25.
- Nassif J, Jumbelic R. Current concepts for relining complete dentures: a survey. *J Prosthet Dent* 1984; 51(1):11–5.
- Arena CA, Evans DB, Hilton TJ. A comparison of bond strengths among chairside hard relin materials. *J Prosthet Dent* 1993; 70(2):126–31.
- Wyatt CC, Harrop TJ, MacEntee MI. A comparison of physical characteristics of six hard denture relin materials. *J Prosthet Dent* 1986; 55(3):343–6.
- Cucci AL, Giampaolo ET, Leonardi P, Vergani CE. Unrestricted linear dimensional changes of two hard chairside relin resins and one heat-curing acrylic resin. *J Prosthet Dent* 1996; 76(4):414–7.
- Mutluay MM, Ruyter IE. Evaluation of adhesion of chairside hard relining materials to denture base polymers. *J Prosthet Dent* 2005; 94(5):445–52.
- Curtis DA, Eggleston TL, Marshall SJ, Watanabe LG. Shear bond strength of visible-light-cured resin relative to heat-cured resin. *Dent Mater* 1989; 5(5):314–8.
- Campanha NH, Pavarina AC, Giampaolo ET, Machado AL, Carlos IZ, Vergani CE. Cytotoxicity of hard chairside relin resins: effect of microwave irradiation and water bath postpolymerization treatments. *Int J Prosthodont* 2006; 19(2):195–201.
- Haywood J, Basker RM, Watson CJ, Wood DJ. A comparison of three hard chairside denture relin materials. Part I. Clinical evaluation. *Eur J Prosthodont Restorat Dent* 2003; 11(4):157–63.
- Javid NS, Michael CG, Mohammed HA, Colaizzi FA. Three-dimensional analysis of maxillary denture displacement during relin impression procedure. *J Prosthet Dent* 1985; 54(2):232–7.
- Firtell DN, Finzen FC, Holmes JB. The effect of clinical remount procedures on the comfort and success of complete dentures. *J Prosthet Dent* 1987; 57(1):53–7.